KEWEENAW BAY INDIAN COMMUNITY

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July 8, 2012

James Caron
Michigan Department of Environmental Quality
Water Resources Division
1420 US Highway 2 West
Crystal Falls, Michigan 49920

Re: Orvana Resources US Corp Copperwood Mine Related Permit Applications: Wetland Protection (NREPA Part 303, Section 404 of the Clean Water Act) and Inland Lakes & Streams (Part 301)

Dear Mr. Caron,

The Keweenaw Bay Indian Community (Community), a federally-recognized Indian tribe, submits the following attached comments related to Orvana Resources US Corp's (Orvana) mine related permit application for proposed wetland and stream fill associated with the Copperwood Project.

Under the Treaty with the Chippewa of 1842, our Community reserved subsistence and cultural rights to hunt, fish, trap and gather on traditional homelands ceded to the United States of America.[1] The proposed activities associated with the Copperwood Project are located within this Treaty territory, approximately 70 miles from the Community's L'Anse reservation and 45 miles from the Community's Ontonagon reservation.

Large scale threats to habitats and ecosystems that support treaty-reserved resources upon the lands and waters of the 1842 Treaty territory are of great concern to the Community. The proposed activities associated with the Copperwood Project would cause unacceptable destruction and degradation to area wetlands and streams of local watersheds of Lake Superior and would negatively impact treaty-reserved rights of the Community. It does not appear the applicant has avoided and minimized negative

[1] See Article 2, Treaty with the Chippewa, 1842. *Available at* <http://digital.library.okstate.edu/kappler/vol2/treaties/chi0542.htm>.

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environmental effects to the greatest extent possible, nor adequately described potentially viable alternatives, therefore the permits should be denied.

Please note that the attached comments have been submitted on behalf of the Community's mining technical review team and do not represent a form of government-to-government consultation. The Community reserves the right to supplement these comments and may request an official consultation on concerns related to the Copperwood Project.

Respectfully submitted,

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Todd Warner, Director, KBIC Natural Resource Dept.

The Keweenaw Bay Indian Community's (Community) concerns with Orvana Resources US Corp Copperwood Mine Related Permit Applications for Wetland Protection (NREPA Part 303, Section 404 of the Clean Water Act) and Inland Lakes & Streams (Part 301) include:

Tailings Disposal Facility (TDF):

The Community is primarily concerned with the substantial adverse impacts associated with Orvana's proposed aboveground tailings dump. We believe that the proposed permanent surface disposal of approximately 32.2 million tons of mine tailings on site would lead to unacceptable destruction and degradation of water and aquatic resources:

- The TDF's footprint would equal 346-acres.
- It would directly fill in about 52 acres of wetland, making up almost 90% of the total wetland impact associated with the project.
- It would directly fill in approximately 13,672 feet of streams—an increase of 5,672 feet from Orvana's original mine permit application.
- It would be located only about 1 ½ miles of Lake Superior.
- It would pose a significant long-term perpetual care risk to area streams and wetlands, and Lake Superior.

The TDF is predicted to release between 24-62 million gallons of leachate into the environment per year. Much of this excess tailings water is likely to migrate to the northwest corner, the lowest point of the TDF called the "decant sump." The tailings leachate—consisting of heavy metals and other contaminants including sulfate, arsenic, cadmium, copper, iron, lead, mercury, selenium, and zinc—is predicted by Orvana to exceed water quality standards without treatment. After mining ceases and the Waste Water Treatment Plant is decommissioned, these heavy metals and other contaminants may leach into area soils, creeks and waters of Lake Superior.

Unfortunately, it is further impossible for the public, tribes and regulatory agencies to have a fully informed view of the TDF's impacts because a final liner design is yet to be determined. Furthermore, engineered cap systems are known to deteriorate due to the natural weathering process and it can be expected that the cap will gradually become more permeable due to wind and storm erosion, plant and tree roots, burrowing animals, differential settlement of the tailings, four-wheelers and/or other human activity, etc. This will of course increase the infiltration of precipitation into the tailings and increase the generation of contaminate-laden leachate. Perpetual care will be required to maintain the cap and to capture and treat tailings seepage to prevent discharge of untreated water to streams and wetlands—including proposed mitigated constructed wetlands within the vicinity of the TDF.

Additional reasonably foreseeable factors and risks associated with the TDF from climate change are also non-existent in the applicant's environmental assessment. In the TDF design and impact assessment, the applicant only accounts for the customary 100-year flood scenario, not 500-year flood events like recently occurred in northern Minnesota.[1] More intense and frequent rain events, storms and other extreme weather are predicted to occur more often due to symptoms of global warming.

[1] Marcotty, Josephine. June 28, 2012. "Flood's mud clouds Lake Superior." Star Tribune. *Available at* <http://www.startribune.com/local/160620275.html>.

These long-term and foreseeable impacts need to be considered when evaluating the direct and indirect impacts to wetlands and streams. The large footprint and degree of negative impact to water and aquatic resources associated with the TDF alone is unacceptable and could be significantly reduced if some of the tailings could be backfilled in the mine. Cemented backfill could have additional benefits for reducing subsidence and the influx of mine re-flooded waters to local aquifers and surface waters. Unfortunately, however, the applicant failed to adequately provide engineering studies to assess backfill feasibility (discussed further in the next section) and should be required to do so, with opportunity for public review and comment, before a permit is issued.

Alternatives Analysis

The burden of evaluating feasible and prudent alternatives is placed upon the 303/301 permit applicant. In accordance with the federal Clean Water Act and precedent of a recent federal objection, the applicant must demonstrate that their preferred alternative is the Least Environmentally Damaging Practicable Alternative (LEDPA). The preferred alternative must *avoid* and *minimize* impacts to the maximum extent possible *prior to mitigation.* Orvana proposes to mitigate for wetland loss, but does not provide enough detailed information to justify the selection of a preferred alternative that foremost avoids and minimizes impacts. Furthermore, substantive review of the applicant's proposed alternatives can only be undertaken if sufficient data and information is provided for the evaluation. As noted in comments below, significant data and information is missing from the application that is critical for adequate review and consideration of alternatives.

The applicant's Alternative Analysis for the TDF included two off-site options, five aboveground on-site options, and only one option for underground tailings disposal as backfill. The applicant deemed the backfill option unviable due to the mine plan and the location of the mine entrance, stating "only after mining has progressed to a point with substantial volumes of mined out areas could tailings be deposited underground in the lowest portions of the mine" (Copperwood Alternative Analysis, 5.1, p. 13). However, the applicant failed to subsequently reconsider aspects of the mine plan and entrance location in order to address such issues.

The applicant states that bulking of the tailings for backfill would double the volume of the tailings and that an aboveground disposal facility would still be required. However, there is lack of documentation and evidence provided by the applicant to adequately explain for such a substantial anticipated increase in the volume of tailings. The Alternative Analysis states "Bulking the tailings" refers to the addition of solidifying agents, such as cement or fly ash, being added to the tailings on at least a 1:1 ratio" (Copperwood Alternative Analysis, 5.1, p. 13). Typically, the geotechnical definition of bulking is the ratio of the volume of intact rock or soil to the volume of excavated rock or soil and calculates the pore space created by breaking up the rock. No explanation is given in the Alternative Analysis as to why bulking is the addition of other constituents, why these constituents must be added, and why "at least" a 1:1 ratio is used which seems like a very high percent.

Because of the bulking factor, it is understood that not all the rock excavated can be placed back underground. The applicant indicates that the placement of tailings underground cannot begin until after mining has occurred for four years and uses it as a basis to exclude further consideration of Alternative 1.

But why not place the first four years production on the surface in a much reduced TDF and all the remaining tailings underground in the mined out areas? Alternative 1 to backfill the tailings into the mined out areas appears to offer a less impactful option, regardless, compared to all of the tailings permanently disposed of aboveground on-site as the applicant proposes.

Moreover, as expressed previously, Orvana is unwilling or has not thought to modify the mine plan to accommodate Alternative 1. This is clear from statements like "*as a result of the mine plan*, there will be no isolated areas to deposit tailings until the deepest portions of the mine are completely mined with no need for access into these areas" or that the mine plan only allows "certain levels of advance" (Copperwood Alternative Analysis, pg 12, 5.1 Alternative 1, *emphasis added*). If backfill is not possible with the current mining plan, why haven't alternate mining plans been developed and considered that would allow backfill? It is unacceptable to not expect and require the applicant to more thoroughly and seriously evaluate Alternative 1, especially considering newer paste backfill technology[2] and that it is essentially industry standard in advanced countries to fill open stopes with backfill.[3]

In addition, the 303/301 Environmental Assessment indicates that several options to reduce subsidence were explored, as well as alternatives for the discharge of treated waste water. However, these supposed alternative options for subsidence and the discharge for treated waste water were not described in the alternatives document. No analysis is provided regarding the benefits of one over another or how the different alternatives may influence stream flows or other direct or indirect impacts to aquatic systems. Both the 303/301 permit application and the anticipated National Pollutant Discharge Elimination System permit application would substantially benefit from a complete analysis of possible alternatives in order to meet Clean Water Act goals of avoiding and minimizing adverse impacts to the nation's water resources and wetlands.

The applicant must be required to re-evaluate their alternatives and provide more efficient documentation and study into Alternative 1, as originally recommended by Orvana's consultants,[4] in order to ensure that the LEDPA is implemented to avoid and minimize the substantial adverse impacts that would occur to wetlands and streams in the Lake Superior basin from this mine development—prior to retreating to mitigation options.

Wetland and Stream Mitigation

The applicant does not describe mitigation measures beyond vague and broad statements of intent (see Sections 6.5.8 and 6.6.5). Ambiguous promises to minimize and mitigate impacts are not an adequate description of mitigation measures. Mitigation measures need to be described in more detail so that their

[2] Palkovits, Frank. 2011. "Paste Thickening: Considerations for Backfill vs. Tailings Management." Engineering & Mining Journal. *Available at* <http://www.e-mj.com/index.php/features/1443-paste-thickening-considerations-for-backfill-vs-tailings-management.html>.

[3] Brady, Barry H. G. 2007. Rock Mechanics: For Underground Mining, 3rd Edition, p. 423. "The current position in technically advanced countries is that very little metalliferous mining, undertaken using pillar support, is not accompanied by subsequent stope filling and pillar mining."

[4] Knight Piesold, Alternative Tailings Disposal, ES-6 of Appendix B. "The reduction of the tailings stored at surface would reduce the required dike construction, surface water diversions, and wetlands impact and thus the total construction and closure costs of the facility. Further engineering studies would be required on potential methods to thicken or filter the tailings in order to produce a suitable material for backfill."

potential effectiveness and function values can be critically evaluated. Existing research evidence suggests that constructed wetlands generally fail to replace benefits lost.[5] The applicant's proposed mitigation plan should evaluate and replace wetland benefits lost.

In addition, proposed stream mitigation is severely lacking and does not describe nor evaluate the quantity and functional values of streams that will be mitigated. The applicant's admittedly "preliminary" stream mitigation plan is to merely remove waste rock from seven stream crossings from historic mine workings and a culvert from Gijik Creek. The applicant states "If additional detail or information is required by MDEQ as a condition of permit issuance, such information will be provided." Such a void of information and perpetual reference to future plans that are critical for informed public and agency review of the project is unacceptable and undermines the intent of the regulatory process and fundamental principles of meaningful public participation.

Considering the inadequacy of the applicant's proposed mitigation plans, the permit application should be denied.

It is also understood that the water-intake structure for the Copperwood Project, to be subsequently proposed by the Gogebic Range Water Authority, is for the primary purpose of supplying the Copperwood Project with water for their mining and ore processing operations. Regardless of Orvana's engagement and agreement with a public water authority, it is very clear that the proposed water intake structure is a "connected action" to the entire Copperwood Project and will involve extensive filling of additional wetlands and stream channels. Despite public statements of intended future benefits of water supply to local residents, the water-intake system would not be necessary if it were not for the proposed Copperwood mine and milling operation. As such, these additional wetland and stream impacts should be considered and mitigated, and most importantly, a federal Environmental Impact Statement should be applied to the entire project under the National Environmental Policy Act.

Wildlife Impacts

Direct wetland and stream habitat loss on the scale of the proposed project will be severe and permanent. Wetlands provide travel corridors and resources for many species which migrate long distances to fulfill food, shelter, territorial, and reproductive needs. Habitat fragmentation on the scale proposed by the applicant directly adjacent to and between two federally designated Wild and Scenic Rivers and the Porcupine Mountain State Wilderness Area could have an effect on large mammal species. Wildlife and birds require undisturbed expansive areas for safe travel between seasonal habitat resources. Eighty percent of America's breeding bird population and more than fifty percent of the eight hundred species of protected migratory birds rely on wetlands.[6]

Birds, mammals, reptiles and amphibians will be killed as their wetland and stream habitat is destroyed, notably abundant beaver populations of Namebinag Creek. The applicant does not deny this impact but merely presents it as insignificant and necessary. In addition, the applicant mistakenly overlooked local bald eagle populations, a species of Special Concern, in their surveys with at least one nest identified by the public and tribal environmental program staff along the Lake Superior shoreline directly adjacent to

[5] National Research Council. 2001. Report entitled "Compensating for Wetland Losses under the Clean Water Act."
[6] Mitsch, William J. and J.G. Gosselink. 1993. Wetlands, second ed. New York: Van Nostrand Reinhold.

the project area (see map and photos attached). No discussion was provided regarding impacts to the bald eagle in the applicant's environmental assessment. Alternatives and strategies to minimize impact to the state endangered Redside Dace should also be described in more detail.

Public Interest - Great Lakes Ecosystem and National Wild & Scenic Rivers

Ecosystem impacts resulting from this project will be severe, disruptive and destructive. Completion of this project is contrary to established ecological values, goals, and objectives for the Great Lakes ecosystem. Natural resources in the Great Lakes basins and the public interest in protection and preservation of these resources have been variously quantified and discussed in many forums on State, local, and National levels. Significant time and effort has been invested by various federal government agencies, tribal nations, state and local governments, community groups, private organizations, non-profit organizations, and the general public on quantifying and categorizing existing natural resources, determining natural resource threats, developing preventative measures for protection of natural resources, and reaffirming the public interest in protection, preservation, and restoration of the Great Lakes ecosystems. Guidance documents and forums relevant to this project include:

- The Lake Superior Lake-wide Management Plan
- The Great Lakes Regional Collaboration
- The Great Lakes Fish Community Objectives for Lake Superior
- The Great Lakes Fish and Wildlife Restoration Act
- The Great Lakes Restoration Initiative Framework
- Michigan's Great Lakes Restoration Strategy
- The Michigan Strategic Framework for the 2010 Great Lakes Restoration Initiative
- The Michigan Wildlife Action Plan

Common themes within the above referenced plans, initiatives and acts include the recognition of the negative impacts of habitat fragmentation, pollutant additions to the Great Lakes ecosystems, contamination of waters, invasive species introduction and spread, habitat destruction, wetland destruction, and other impacts which will result from this proposed project. Considering that the proposed project is contradictory to nationally identified values and natural resource goals, the permits should be denied.

The proposed activities related to the Copperwood Project are also distinctly located between two federally designated Wild and Scenic Rivers of Lake Superior: the Black River[7] and the Presque Isle River.[8] The National Wild and Scenic Rivers System was established to protect public conservation values for such rivers.

> It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural or other similar values, shall be preserved in

[7] http://www.rivers.gov/rivers/rivers/black-mi.php
[8] http://www.rivers.gov/rivers/rivers/presque-isle.php

> free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.[9]

Potential adverse direct and indirect impacts to these nationally valued rivers and their immediate interconnected ecosystem should be taken into account when considering the public interest. The estimated 13-year mine life of the proposed Copperwood Project shouldn't justify the extensive long-term and permanent damage the project poses to water resources of Lake Superior, and therefore, should not be deemed in the public interest as proposed.

Summary

The proposed activities associated with the Copperwood Project would cause unacceptable degradation and destruction to streams and wetlands within our 1842 Treaty territory and local watersheds of Lake Superior. The proposed activities would negatively impact treaty-reserved rights of the Community. The applicant has not provided sufficient evidence to support its preferred alternative of permanent surface disposal of all tailings which will require perpetual care long after mining ceases. In addition, the applicant failed to adequately describe, account for and replace lost values and benefits of wetlands and streams in their mitigation plans. Numerous critical data and information necessary for adequate public and regulatory review are absent in the application. The applicant has failed to show, as required by the laws of Michigan, that the proposed activities associated with the Copperwood Project "will not pollute, impair or destroy the air, water or other natural resources or the public trust in those resources."

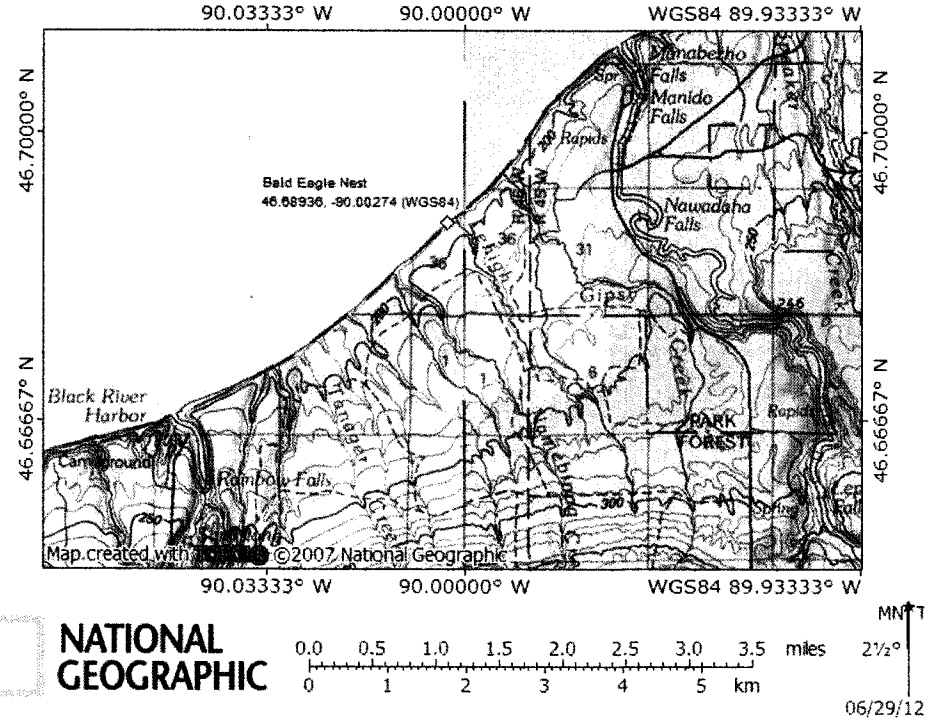
Most importantly, it is clear that the applicant has not avoided and minimized negative environmental effects to the greatest extent possible, therefore the permits should be denied.

[9] National Wild and Scenic Rivers Act of 1968, Public Law 90-542; 16 U.S.C. 1271 et seq.

Attachments - overlooked bald eagles near the project site

#1: Photo of a bald eagle nest with associated map location courtesy Steve Garske a resident of Marenisco, Mich., in Gogebic County, June 9, 2012.

Active bald eagle nest, Gogebic County, MI. Observed June 9, 2012.



#2: Photos near the same location courtesy the Bad River Band of Lake Superior Chippewa Environmental Department, May 11, 2012.